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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/613,328

07/02/2003

Michael V. Paukshto

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38834 7590 06/28/2007  
WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP  
1250 CONNECTICUT AVENUE, NW  
SUITE 700  
WASHINGTON, DC 20036

EXAMINER

NGUYEN, THANH NHAN P

ART UNIT

PAPER NUMBER

2871

MAIL DATE

DELIVERY MODE

06/28/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/613,328

Applicant(s)

PAUKSHTO ET AL.

Examiner

(Nancy) Thanh-Nhan P. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 May 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-5 and 7-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### **Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-5, 7-9, 12-14, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paukshto et al "Two Novel Applications of Thin-Film E-Type Polarizers" in view of Ignatov et al "Thin Crystal Film Polarizers and Retarders" further in view of Suzuki U.S. Patent Application Publication No. 2002/0089621.**

**Regarding claims 1, 2 and 22,** Paukshto et al discloses a method of making a liquid crystal display comprising: a front panel comprising a front alignment layer having an alignment direction; a rear panel comprising a rear alignment layer having an alignment direction; and a liquid crystal layer between the front and rear alignment layers, wherein the front and rear panels further comprises a front and rear polarizers, said polarizer comprised of a thin crystal film; wherein the liquid crystal layer has a rotational twist angle of about 90.degree., a pre-tilt angle of not more than 2.degree., [col. 2, lines 3-13].

Paukshto et al lacks disclosure of the polarizer is a thin crystal film polarizer manufactured from aromatic organic compounds, and the interplanar distance of the

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thin crystal film in the direction of any optical axis is  $3.4 \pm 0.3\text{\AA}$ . However, this interplanar distance is common for aromatic compounds in crystal and aggregates, as evidenced by Ignatov et al, ["X-Ray Study of TCF" – 3<sup>rd</sup> par.], for possible achieving great thin crystal film such as having enhanced viewing angle characteristic, high temperature and environmental stability, [Abstract & Introduction, 2<sup>nd</sup> par.]. Therefore, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have E-type polarizer is a thin crystal film polarizer manufactured from aromatic organic compounds, and the interplanar distance of the thin crystal film in the direction of any optical axis is  $3.4 \pm 0.3\text{\AA}$  for possible achieving great thin crystal film such as having enhanced viewing angle characteristic, high temperature and environmental stability.

Further, even though Paukshto lacks disclosure of the method of making a liquid crystal display comprising of setting the direction of liquid crystal directors coinciding with an off-normal viewing direction of liquid crystal display at the mid-point of the rotational twist when a voltage is applied to the liquid crystal layer by selecting the alignment, material and thickness of the liquid crystal layer whereby a maximum image contrast is achieved in the off-normal viewing direction, wherein the off-normal viewing direction is in the range of 15 degree. to 35 degree. in azimuth angle, and in this range, the maximum contrast ratio is not lower than 40, Paukshto's device would have achieved these features since the reference by Paukshto has met the structure of the invention. Further, the result of having direction of liquid crystal directors coinciding with an off-normal viewing direction of the liquid crystal display at the mid-point of the

rotational twist when a voltage applied to the liquid crystal to achieve a maximum image contrast in the off-normal viewing direction would be inherently in twisted nematic liquid crystal display device.

**Regarding claim 5**, Paukshto et al discloses at least one of front and rear polarizers is E-type polarizer, [col. 2, lines 3-13]; Paukshto et al lacks disclosure of the transmission axis of the E-type polarizer and the alignment direction of the alignment layer in the same panel as the E-type polarizer are perpendicular.

Suzuki teaches the transmission axis of E-type polarizer and the alignment direction of the alignment layer in the same panel as the E-type polarizer are perpendicular, [par. 0020], for the benefit of having high contrast in liquid crystal display, [par. 0027].

Therefore, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have the transmission axis of E-type polarizer and the alignment direction of the alignment layer in the same panel as the E-type polarizer are perpendicular for the benefit of having high contrast in liquid crystal display.

**Regarding claim 23**, Paukshto et al lacks disclosure of the E-type polarizer is a thin crystal film polarizer manufactured from aromatic organic compounds, and the interplanar distance of the thin crystal film in the direction of any optical axis is  $3.4 \pm 0.3\text{\AA}$ . However, this interplanar distance is common for aromatic compounds in crystal and aggregates, as evidenced by Ignatov et al, ["X-Ray Study of TCF" – 3<sup>rd</sup> par.], for possible achieving great thin crystal film such as having enhanced viewing angle characteristic, high temperature and environmental stability, [Abstract & Introduction, 2<sup>nd</sup>

par.]. Therefore, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have E-type polarizer is a thin crystal film polarizer manufactured from aromatic organic compounds, and the interplanar distance of the thin crystal film in the direction of any optical axis is  $3.4 \pm 0.3\text{\AA}$  for possible achieving great thin crystal film such as having enhanced viewing angle characteristic, high temperature and environmental stability.

**Regarding claims 7-9,** Paukshto et al lacks disclosure of wherein at least one of the aromatic organic compounds contains heterocycles; the thin crystal film is formed from a lyotropic liquid crystal based on at least one dichroic dye; wherein the thin crystal film is treated with ions of bi-or/and trivalent metals.

However, it was conventional at the time to have at least one of the aromatic organic compounds contains heterocycles; the thin crystal film is formed from a lyotropic liquid crystal based on at least one dichroic dye; wherein the thin crystal film is treated with ions of bi-or/and trivalent metals for the benefit of achieving high temperature and environmental stability, as evidenced by Iganatov et al, ["Introduction" – 1<sup>st</sup> and 2<sup>nd</sup> pars.; "Materials and Method" – 1<sup>st</sup> & 2<sup>nd</sup> pars.] Therefore, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have at least one of the aromatic organic compounds contains heterocycles; the thin crystal film is formed from a lyotropic liquid crystal based on at least one dichroic dye; wherein the thin crystal film is treated with ions of bi-or/and trivalent metals for the benefit of achieving high temperature and environmental stability, as evidenced by Iganatov et al.

**Regarding claim 14**, Paukshto et al discloses at least one of the front and rear polarizers is an internal polarizer, [col. 2, lines 3-13].

**Regarding claims 3-4**, Paukshto et al lacks disclosure of the transmission axes of the front and rear polarizers are perpendicular; or the transmission axes of the front and rear polarizers are parallel.

It was well known that placing the polarizers so that the transmission axes of the front and rear polarizers are perpendicular or parallel to each other to have liquid crystal display operating in normal white mode or normal black mode, as evidenced by Suzuki, [see figure 8, and paragraph 0009]. Therefore, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to place the polarizers wherein the transmission axes of the front and rear polarizes are perpendicular or parallel to each other for the purpose of having liquid crystal display operating in normal white mode or normal black mode.

**Regarding claim 12**, Paukshto et al lacks of disclosing the transmission axis of the front polarizer and the alignment direction of the front alignment layer formed an angle at 90 degree.

Suzuki discloses the transmission axis of the front polarizer and the alignment direction of the front alignment layer formed an angle at 90 degree, [par. 0020].

**Regarding claim 13**, Paukshto et al lacks of disclosing the transmission axis of the rear polarizer and the alignment direction of the rear alignment layer form an angle at 0 degree.

Suzuki discloses the transmission axis of the rear polarizer and the alignment direction of the rear alignment layer form an angle at 0 degree, [par. 0020].

**The above listed features of claims 12-13** are described in Suzuki's disclosure as being for the benefit of having high contrast in liquid crystal display, [see paragraph 0027]. Therefore, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use O-type / E-type polarizers, and arrange the transmission axes of the polarizers and the alignment direction of the alignment layers in certain ways, as described above, for the benefit of having high contrast in liquid crystal display.

**Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paukshto et al in view of Ignatov et al, and further in view of Kurtz et al U.S. Patent Application Publication No. 2005/0151905.**

**Regarding claim 10**, Paukshto et al lacks disclosure of the front and rear polarizers are O-type polarizers.

It was well known to use O-type polarizers for the benefit of being available, and having high transmission of light during open state, as evidenced by Kurtz et al, [par. 0065]. Therefore, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use O-type polarizers for the benefit of being available, and having high transmission of light during open state.

**Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paukshto et al in view of Ignatov et al and Kurtz et al, and further in view of Suzuki U.S. Patent Application Publication No. 2002/0089621.**



**Regarding claim 11**, Paukshto et al lacks disclosure of the transmission axis of the front O-type polarizer is parallel to the alignment direction of the front alignment layer, and the transmission axis of the rear O-type polarizer is parallel to the alignment direction of the rear alignment layer.

Suzuki discloses the transmission axis of the front polarizer is parallel to the alignment direction of the front alignment layer, and the transmission axis of the rear polarizer is parallel to the alignment direction of the rear alignment layer, [par. 0021], for the benefit of having high contrast in liquid crystal display, [see paragraph 0027]. Therefore, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have the transmission axis of the front polarizer is parallel to the alignment direction of the front alignment layer, and the transmission axis of the rear polarizer is parallel to the alignment direction of the rear alignment layer for the benefit of having high contrast in liquid crystal display.

**Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paukshto et al in view of Ignatov et al, and further in view of Lazarev et al "E-type Polarizers and Retarders."**

**Regarding claim 15**, Paukshto et al lacks disclosure of wherein the internal polarizer has at least one of the functions selected from the group consisting of an alignment layer, color correction filter, retarder, and any combination thereof.

It would have been obvious to one ordinary skill in the art at the time the invention was made to have the internal polarizer has at least one of the functions selected from the group consisting of an alignment layer, color correction filter, retarder,

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and any combination thereof, as evidenced by Lazarev et al, ["Introduction" – 3<sup>rd</sup> par.], for having multi-function from 1 layer, and therefore it would be possible to reduce the weight of the total device.

**Claims 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paukshto et al in view of Ignatov et al, further in view of Kaneko U.S. Patent Application Publication No. 2002/0145689.**

**Regarding claims 16-18,** Paukshto et al lacks disclosure of the liquid crystal display further comprises a reflective layer, wherein the reflective layer is semitransparent; and a backlight system.

Kaneko discloses the liquid crystal display further comprises a reflective layer, wherein the reflective layer is semitransparent (9 and 30); and a backlight system (16), [fig. 1], as for the well known benefit of using the liquid crystal display as a transfective liquid crystal display to save power and improve brightness. Therefore, at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use semitransparent reflective layer, and a backlight system in liquid crystal display for the benefit of saving power and improving brightness.

**Regarding claim 20,** Paukshto et al lacks of disclosing the liquid crystal display further comprises a light-scattering layer.

Kaneko discloses the liquid crystal display further comprises a light-scattering layer (15), [fig. 4], as for the well know benefit of improving high contrast and brightness. Therefore, at the time the invention was made, it would have been obvious to a person

of ordinary skill in the art to have light-scattering layer in liquid crystal for the benefit of improving high contrast and brightness.

**Regarding claims 19 and 21**, the language regarding the use as an antireflection layer or the retarder layer is an intended use limitation, and therefore does not patentably distinguish the invention.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-5 and 7-23 have been considered but are moot in view of the new ground(s) of rejection.

### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to (Nancy) Thanh-Nhan P. Nguyen whose telephone number is 571-272-1673. The examiner can normally be reached on Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 571-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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(Nancy) Thanh-Nhan P Nguyen

Examiner

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TN

  
ANDREW SCHECHTER  
PRIMARY EXAMINER